

WHAT IS CLAIMED IS:

1. An optical transmission system comprising:
an optical transmitter transmitting a WDM optical signal including a plurality of optical signals with different wavelengths;

means for amplifying the WDM optical signal received from the optical transmitter with substantially equal gain with respect to the wavelengths of the plurality of the optical signals and for outputting the amplified WDM optical signal; and

an optical receiver receiving the amplified WDM optical signal output from said means,

said means including

a first-stage optical amplifier which amplifies the received WDM optical signal,

a level controller which controls a power level of the WDM optical signal amplified by the first-stage optical amplifier, and

a second-stage optical amplifier which amplifies the WDM optical signal of which level is controlled by the level controller.

2. An optical transmission system comprising:

a first optical transmission line through which a WDM optical signal including a plurality of optical signals with different wavelengths is transmitted;

an optical amplifier with a configuration to amplify the WDM optical signal with substantially equal gain over the wavelengths of the optical signals; and

a second optical transmission line through which the amplified WDM optical signal is transmitted, wherein the configuration of the optical amplifier includes

a front-stage optical amplifier which amplifies the WDM optical signal to produce a front-stage amplified WDM optical signal,

a level controller which controls a power level of the front-stage amplified WDM optical signal and outputs a controlled WDM optical signal, and

a rear-stage optical amplifier which amplifies the controlled WDM optical signal to produce a rear-stage amplified WDM optical signal.

3. An optical transmission system comprising:

an optical transmitter transmitting a WDM optical signal including a plurality of optical signals with different wavelengths;

an optical amplifier with a configuration to amplify the WDM optical signal from the optical transmitter with substantially equal gain over the wavelengths of the optical signals; and

an optical receiver receiving the amplified WDM optical signal from the optical amplifier, wherein the configuration of the optical amplifier includes

a first-stage optical amplifier which amplifies the WDM optical signal,

a level controller which controls a power level of the WDM optical signal amplified by the first-stage optical amplifier, and

a second-stage optical amplifier which amplifies the WDM optical signal of which level is controlled by the level controller.

4. An optical transmission system comprising:

an optical transmitter transmitting a WDM optical signal including a plurality of optical signals with different wavelengths through a first optical transmission line;

means for amplifying the WDM optical signal received from the first optical transmission line with substantially equal gain with respect to the wavelengths of the plurality of the optical signals and for outputting the amplified WDM optical signal, the means including

a first-stage optical amplifier which amplifies the received WDM optical signal,

a level controller which controls a power level of the WDM optical signal amplified by the first-stage optical amplifier, and

a second-stage optical amplifier which amplifies the WDM optical signal of which level is controlled by the level controller; and

an optical receiver receiving the amplified WDM optical signal through a second optical transmission line through.

5. An optical transmission system comprising:

an optical transmitter transmitting a WDM optical signal including a plurality of optical signals with different wavelengths;

an optical amplifier amplifying the WDM optical signal from the optical transmitter, the optical amplifier including

a first-stage optical amplifier which amplifies the WDM optical signal,

a level controller which controls a power level of the WDM optical signal amplified by the first-stage optical amplifier,

a second-stage optical amplifier which amplifies the WDM optical signal of which level is controlled by the level controller, and

a gain controller controlling the first-stage optical amplifier, the level controller and the second-stage optical amplifier to obtain the second-stage amplified WDM signal in which the plurality of optical signals are amplified with substantially equal gain; and

an optical receiver receiving the second-stage amplified WDM optical signal transmitted from the optical amplifier.

6. A WDM optical transmission system comprising:

an optical transmitter transmitting a WDM optical signal including a plurality of optical signals with different wavelengths through a first optical transmission line;

a multi-stage optical amplifier amplifying the WDM optical signal received from the first optical transmission line and outputting the amplified WDM optical signal to a second optical transmission line; and

an optical receiver receiving the amplified WDM optical signal from the second optical transmission line, the multi-stage optical amplifier including

a first-stage optical amplifier which has an optical fiber for amplifying the WDM optical signal with a first gain, to produce a first-stage amplified WDM optical signal,

a level controller controlling the power level of the first-stage amplified WDM optical signal, to produce a level controlled WDM optical signal, and

a second-stage optical amplifier which has an optical fiber for amplifying the level controlled WDM optical signal with a second gain, to produce a second-stage amplified WDM optical signal, wherein the level controller controls the power level of the first-stage amplified WDM optical signal, and the first gain and the second gain are controlled, so that the multi-stage optical amplifier amplifies the plurality of optical signals with substantially equal gain.

7. A WDM optical transmission system comprising:

a first optical transmission line through which a WDM optical signal including a plurality of optical signals with different wavelengths is transmitted;

a multi-stage optical amplifier amplifying the WDM optical signal received from the first optical transmission line; and

a second optical transmission line transmitting the amplified WDM optical signal from the multi-stage optical amplifier, the multi-stage optical amplifier including

a first-stage optical amplifier receiving a WDM optical signal including a plurality of optical signals with different wavelengths, and amplifying the received WDM optical signal,

a level controller controlling a power level of the WDM optical signal amplified by the first-stage optical amplifier,

a second-stage optical amplifier amplifying the WDM optical signal of which level is controlled by the level controller, and

a gain controller controlling the first-stage optical amplifier, the level controller and the second-stage optical amplifier to cause the plurality of optical signals to be amplified with substantially equal gain over the wavelengths of the optical signals, the gain being a gain of the WDM optical signal as amplified by second-stage optical amplifier with respect to the WDM optical signal as received by the first-stage optical amplifier.